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REVIEW OF THE

TELEGRAPH AND TELEPHONE

A JOURNAL OF ELECTRICAL, SCIENTIFIC AND MECHANICAL NEWS.

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How the News Comes In.

The reporter reclines in his Turkish divan,
And "rehashes" reports from Arabi Bey,
The exchange man sleeps on the new tête-à-tête;
There's no news afloat in the city to-day.

The compositors doze in their plush-covered chairs,
And on the piano listlessly play.
The 'devil' his fragrant Havana disports;
There's no news afloat in the city to day.

The pressman, enjoying a champagne lunch,
Some way to dispose of their surplus week's pay,
And all over the office tranquility reigns;
There's no news afloat in the city to-day.

The Crystal Palace Electrical Exhibition Awards.

The list of prizes awarded in connection with this exhibition has been issued. It comprises ten diplomas of honor, awarded to exhibitors not competing for trade purposes; twenty-nine gold medals, nine of which were awarded for steam and gas engines; twenty-eight silver, and thirty-four bronze medals.

Atlantic Cable Competition.

The English papers are commencing again to discuss the above subject, and appear to reach the conclusion that no combination of existing companies will be able to prevent future competition. The *Economist* shows that within a couple of months of the conclusion of the joint-purse agreement between the Anglo-American and the Jay Gould companies two new cable schemes started to reopen that competition which the Anglo-American directors sacrificed so much to prevent. No better commentary than this, the *Economist* thinks, could be afforded of the utter futility of these efforts on the part of the Anglo-American board. Competition in such an important field is bound, sooner or later, to be established, and the sooner the original company recognizes this fact the better it will be for the pockets of their shareholders. Had the Gould cables been left to themselves, preparations for the laying of the proposed "European" and the "Garrett" cables would never have been made; and had the direct United States and French companies been left to shift for themselves, in all probability we should never have heard of the Gould competition. The prospectus of The European, American, Canadian, and Asiatic Cable Company, which appears this week, the London periodical proceeds to say, foreshadows a ninepenny word-rate; and the question now is, whether upon the establishment of this or some other rival route the Anglo-American directors will at once proceed to lower their tariff to 6d. or 4d. so as to force the opposition company into accepting terms similar to those forced upon their predecessors. Should such a course be followed, room will thereby be created for the introduction of further Atlantic cable companies. How long will the Anglo-American directors take to learn that it is the wisest policy to accept the inevitable? Time after time they have fought against it during the past ten years; and the result of each and all of the joint-purse agreements has been to leave The Anglo-American Company worse off than it was before. The following is the present market value of Anglo-American stock:

Aug., 1873—after agreement with			1st French Co.	90
May, 1877—	"	"	Direct U.S. "	60
Feb., 1881—	"	"	2d French "	59
June, 1882—	"	"	Gould "	52½
Present price				50

The above views are entirely sound. Nevertheless, the new companies will be more fortunate than is expected if the old companies do not reduce their present rates below that proposed by their new rivals. In that case, the matter will resolve it simply into one of financial endurance.

Edison Electric Light in the Lower District.

Everything is now finished except putting in the fixtures which support the lamps. Bergmann & Co. are furnishing these brackets and electroliers, as the Edison chandeliers are called, at the rate of 100 a day, and 1,900 are in. When 1,100 more are in place, the current will be turned on. Edison has made frequent tests, having 1,000 lamps lighted every day in the Pearl Street station, and finds no defects. The street mains have been connected with the wires of 270 buildings. At a meeting of the company held last week Edison was asked whether any obstacle now remained to lighting up the down town district, and replied that he knew of none, but that, not having solved all of Nature's secrets, he could not tell what would happen. His tests made down town were satisfactory.

During the last week the Edison light has been ordered for several important establishments in other States. The Sibley Manufacturing Company, of Augusta, Ga., the largest cotton mill in the South, has ordered a plant for 400 lamps. The Merrick Thread Company, of Holyoke, Mass., who have had 120 Edison lamps running since last April, have ordered a plant for 360 lamps.

"Mind your own business," is as good a motto for newspapers, in their relations with one another, as it is for individuals.

Electric Railways.

The development of electric railways in Europe is considerable. Putting aside numerous lines that are merely projected, those which are working show a length of about 100 miles. Those now in operation include one at Lichterfelde, and that from the Spandauer Bock to Charlottenberg, near Berlin; another from Port Rush to Bush Mills, in the North of Ireland, and in Holland from Zandvoort to Kostverloren. Among lines in construction the following are noted: In Austria, the Moedling line, near Vienna; in Germany, from Wiesbaden to Nurnberg, and from the royal mines of Saxony to Zankerode; in England, under the Thames, connecting Charing Cross and Waterloo stations; also in South Wales, for which the force will be derived from fall of water. In Italy, Turin and Milan will soon begin the construction of electric roads.

Some further facts concerning the National Telephone Convention which meets in Boston on the 5th inst., will be found on the 212th and 216th pages.

Electrical Energy.

The great utility of a thoroughly practical method of conserving electrical force has caused a great deal of thought to be given to the subject. No system of electric supply can be considered as perfect until some means are devised to so store up electricity that it can be drawn off equally and regularly, whether the generator be in operation or not. The discovery by Volta of the battery now known as the Voltaic battery was in the year 1800, and as early as 1801 Dr. Gautherot observed the phenomena of electrical storage of energy. In 1803 Ritter of Zena devised a battery for making use of electrical stored energy. In 1859, M. Gaston Planté of Paris made the important discovery that lead gave double the power of other plates in storage batteries, as previously used. Up to this time the process of storage had been cumbersome and slow. In 1880, Faure of France made a storage battery, in which the red lead of commerce was mechanically spread on the battery plates and the slow process of forming an oxide by the electric current was avoided, and batteries thus constructed could be powerfully charged in a brief time. The announcement of this new battery and the wonderful results it gave led students in electrical science everywhere to renewed efforts to improve upon it.

In December, 1882, Henry Sutton announced to the Royal Society of England that he had devised a storage battery, which consisted of a long strip of lead and another similar strip of sheet copper, separated by a layer of sheet rubber and wound together into a roll. This roll was placed in a glass jar four

inches deep and four inches in diameter, and filled with a solution of sulphate of copper—common blue vitriol. The sheets of lead, copper, and rubber were perforated to allow the free circulation of the liquid, and all crystals of the blue vitriol excluded from the solution. The copper being made the positive electrode, the solution, which is highly blue, loses its color. When the cell is fully charged the solution is colorless. During the discharge of the storage battery the solution assumes its original azure hue. This change of color forms a beautiful means of telling where the cell is charged; it is a veritable charging gauge. The power of the battery is very great and very constant. It can be made to last for hours, time being dependent upon the quantity of sulphate of copper decomposed.

This form of battery was in turn improved upon by Charles E. Buell, of this city, who employed common lead shot, coated with mercury, and placed in a porous cup. He put this cup in a glass cell and surrounded it with a coil of copper wire-cloth which served as the positive electrode. The employment of shot and wire-cloth furnished the greatest surface in a given weight and constitutes a form most easily made. Mr. Buell verifies the published statement of Mr. Sutton, that a cell four inches high and four inches in diameter will keep a No. 28 iron wire at red heat for two hours; that it is more constant, and does not polarize during discharge as does the Faure battery. It weighs very much less, occupies less space, and costs less than the Faure battery of like force, and is untrammeled by patent rights.

A Winter Electric Exhibition.

Arrangements are now being made to hold an exhibition in London, illustrating the development of practical electricity. This exhibition, which will commence in November next, to remain open till the following March, will be held at the Westminster Aquarium. The situation and the size of this building render it well adapted for the purpose, and we may hope to see a collection, which, if it does not equal in completeness, the famous show at the Palais de l'Industrie last year, will at all events comprise most of what there is of novelty and interest in connection with electric lighting. The area of the building being limited, the various exhibits will be concentrated as it were, affording the greatest possible facilities for examination and comparison to the visitor.

The scope of the coming exhibition will not be so large as those either of the Palais de l'Industrie or of the Crystal Palace, being limited chiefly to electrical development in telephones, electric lighting, transmission of power, and the practical application of electric energy to useful work. To these should be added a collection as complete as possible of early apparatus, in order to afford facilities not only for comparison, but also to give information as to what has been already done and practically forgotten. The Pacinotti machine, shown at the Palais de l'Industrie, brought into prominence one of the earliest dynamo generators, that had been previously only briefly mentioned in a few books, and there are many other models and apparatus of an early date still in existence, the presence of which would be invaluable in such an exhibition as the one now proposed.

A useful restriction is made in the conditions of the programme, in reference to the extent of each display, no single exhibitor being allowed more than 40 horse-power. By this means the space available will be more fairly distributed, and there will be less danger of one exhibitor unduly eclipsing another. It is to be regretted that no means can be devised of working the installations under the conditions of every-day practice, since the actual value of a system, as seen at an exhibition, where it is constantly tended and carefully watched, cannot be fairly estimated. Prizes to a considerable value will be distributed; the subjects for competition being divided into eighteen heads. Of these the principal refer to electric storage; to electro-motors and the utilization of natural forces—winds, water and the tides—for the production of electricity; to meters, fittings for various purposes, conductors, thermopiles, and photometers; to plans for lighting stations, capable of feeding 20,000 incandescent lights, distributed over an area one mile in radius; mining and submarine lamps; to dynamo machines, etc. The conditions of competition for the prizes are not yet issued; it is to be hoped that they will be carefully compiled and thoroughly carried out. We have little doubt but that this forthcoming exhibition will prove successful, and will be a valuable means of further popularizing the science of electric lighting; we trust that the organizers of the undertaking will take efficient measures to prevent a repetition of the annoyance to which exhibitors at the Crystal Palace were subjected by the insurance companies. If there is any danger of extortionate premiums being demanded to cover imaginary risks, no time should be lost in following the suggestion we made when referring to this subject on a previous occasion, that the principal electric lighting companies should combine in forming an insurance association amongst themselves, and so render themselves independent of existing companies.

"On Singing Condensers."

By W. Holtz.

In view of the attention which has been latterly given to the so called singing condensers, I remark that as far back as 1875 (*Annalen*, 1875, p. 496), I made mention of a similar phenomenon, which, however, remained unnoticed. I observed it in hollow metallic discs, which I used as the electrodes of an influence machine, on bringing them so near that sparks struck across between them. I remarked then that on gradual approximation the tone did not become continually higher, but occasionally ceased entirely, because the dimension of the disc could not correspond to every height of tone, and that this is the best proof that the sound in question is not merely the sound of discharges, which may be also proved by transferring the latter to a distance. Whoever wishes to repeat the experiment, for which a single disc suffices, placed opposite a large globe, will proceed most correctly, in order to vary the approximation and the length of sparks independently of each other, if he allows the sparks to strike from one discharging rod to one of the sliding cylinders of the well known intercalatory apparatus. With a certain succession of sparks and at a certain approximation the disc sings more distinctly, but it can sing at very different heights. Generally we hear simultaneously several and, indeed, disharmonic tones, such as may be heard in vibrating plates. Leyden jars must be first removed. — *Wiedemann's Annalen.*

Carbons for the Electric Light.

At a meeting of the Paris Academy of Science, M. Jacquelain pointed out that carbon for the electric light should be purer than that obtained by calcining wood; and, if not free from hydrogen, should, at any rate, contain no mineral impurities. There are three methods for accomplishing this result: (1.) By the action of a jet of dry chlorine gas directed on the carbon, raised to a light red heat; (2), by the action of potash and caustic soda in fusion; and (3), by the action of hydrofluoric acid on the finished carbons. M. Jacquelain has prepared carbons by all three methods, and has summed up in a table the photometric results of his experiments. He comes to the conclusion that the luminous power and the regularity of the voltaic arc increase in direct ratio to the density, hardness and purity of the carbons. He remarked, incidentally, that the natural graphitoïd of Siberia possesses the singular and unexpected property of acquiring by purification a luminous capacity double that which it has in the natural state, and which exceeds by one-sixth that of pure artificial carbons.

Extinguishing the Electric Light.

For maliciously extinguishing the electric light in St. Enoch Station, Glasgow, Peter Smith, who had been an employe of the Glasgow and South Western Railway Company, was fined two guineas, with the alternative of twenty days' imprisonment, at the Central Police Court of Glasgow lately.

Electric Transmission of Power.

According to M. J. J Chretien, the first attempt to transmit motive power by electricity was made in 1873, at the Vienna Exposition, by H. Fontaine. In 1876, at Philadelphia, and in 1878, at Paris, the experiment was repeated. Patents were afterward taken out by Chretien and by Felix for the application of this mode of transmission to cranes and hoisting apparatus. Important experiments upon ploughing by electricity were made at Sermaize, early in 1879, and since that period great progress has been made in pumping, pile-driving, punching, sawing, sewing, embroidering, weaving, printing, etc. M. Chretien thinks that it is safe to calculate upon the transmission of 50 per cent. of the whole power. Falls and watercourses, when properly regulated, would allow the utilization of a considerable motive force, at the same time that they favored irrigation and diminished the probability of disastrous freshets. Tides and windmills, in spite of the intermittence of their labor, may be advantageously used through the help of accumulators. Solar heat, when transformed into electricity, seems to offer a more desirable solution than the direct application to the production of steam. Coal can be more profitably employed under large boilers, which supply powerful and well-perfected motors, at a moderate rate of consumption, than under smaller boilers, which consume from five to thirty times as much fuel per horse power.

The Electric Exhibition in London.

Last week we called attention to the proposed electrical exhibition to be held at the Westminster Aquarium during the coming winter; we may now add a few supplementary remarks to that notice. It is intended that the exhibits shall, as far as possible, be subjected to practical and useful tests, with the view of ascertaining the actual and relative values of the various systems and apparatus shown. Thus a preliminary programme has been arranged for testing the different kinds of incandescent lamps, for the best system of which a prize of one hundred guineas will be offered. It is proposed that each exhibitor entering this competition should be allotted a chandelier of 100 lights, the details of arrangement being left to the respective exhibitors, while the directors of the exhibition will retain the entire control of the various chandeliers. A record of all renewals rendered necessary will be made, the different causes of such renewals being noted; from time to time photometric measurements will be taken, and the power absorbed in producing the light will be accurately ascertained. The duration of lighting during the proposed term of the exhibition will be about 800 hours; and, as it is intended to make the necessary tests frequently, a very accurate estimate of the relative values of differ-

ent systems will be obtained. In a similar way, information will be gained in reference to storage batteries, and a prize of 100 guineas will be offered for the best system, including batteries, adapted for a central depot, and small portable wires to feed six incandescent lamps. The electrical engineer to the exhibition is Mr. W. D. Gooch, and under his able management the undertaking should prove a complete success, the extent and site of the building rendering it peculiarly well adapted for an exhibition of this kind.

Crystal Palace International Electric Exhibition, 1882.

The directors have pleasure in announcing that they have received from the jurors the following award of prizes:—

DIPLOMAS OF HONOR.

Awarded to exhibitors not competing for trade motives.

Her Majesty's Postmaster-General.
The Secretary for War.
The Anglo-American Telegraph Co.
The Eastern Telegraph Co.
The Telegraph Construction and Maintenance Co.
The Submarine Telegraph Co.
The South-Eastern Railway.
The London, Brighton, and South-Coast Railway.
For the general excellence of their exhibits.

C. F. Varley.—For his induction machine and condensers.
R. H. Froude.—For dynamometer.

GOLD MEDALS.

J. R. Voss.—For induction machine.
Elkington & Co.—For their deposition of gold alloys and general excellence.
H. Wiggin & Co.—Improvements in electro deposition of nickel and cobalt.
The Faure Electric Accumulator Co.—For Faure battery.
Prof. Thomas A. Edison.—For complete system of Electric lighting and other exhibits.
British Electric Light Co.—For Gramme dynamo machine and exhibit.
R. E. Compton.—For Bürgin dynamo machine and Compton arc lamp.
Anglo-American Brush Co.—For Brush dynamo machine and arc lamp.
Swan's Electric Light Co.—For incandescent lamp.
Electric Light and Power Generator Co.—For Weston and Maxim dynamo machines and lamps.
White House Mills.—For dynamo machine.
Rowatt & Fyfe.—For Pilsen arc and Joel semi-incandescent lamps.
G. G. André.—For arc lamp and regulator.
Gérard & Co.—For arc lamp.
Davey, Paxman & Co.—For steam engines.
Galloway & Sons.—For steam engines.
Marshall & Co.—For steam engines.
Robey & Co.—For steam engines.
Ransomes, Head, and Jefferies.—For steam engines.
Hornsby & Sons.—For steam engines.
E. S. Hindley.—For steam engines.
Crossley Brothers.—For Otto gas engine.
Thomson, Sterne & Co.—For Clerk's gas engine.
Roos and Ostrogovich.—For their application of the automatic system to Hughes' type printing apparatus.
Johnson & Phillips.—For the general excellence of their exhibits.
Direct United States Cable Co.—For the excellence of their exhibits.
Edward B. Bright.—For his fire alarm system.
The Exchange Telegraph Co.—For the general excellence of their exhibits.
Professor Dolbear.—For his new electrostatic telephone.

SILVER MEDALS.

Coxeter & Sons.—Class X.
W. Elmore —Class XI.
United Asbestos Co.—Class XIII.
J. & H. Gwynne.—For steam engines.
Fyfe & Main.—For arc lamp.
National Electric Light Co.—For dynamo machine and lamps.
Gravier & Co.—For arc lamp and exhibit.
R. Hodson —For steam engines.
Hammond Electric Light Co.—For installation of Brush machines and lamps.
A. Cance.—For arc lamp.
Domestic Electric Lighting Co.—For the general exhibit.
Electric Lighting Supply Co.
Electric Lighting Engineering Co.
Strode & Co.
W. Ladd & Co.—For early historical dynamo machine.
W. J. Hammer.—For historical collection of incandescent lamps.
W. T. Henley —For his cable core.
W. R. Sykes —For his electric locking and blocking system of railway signals.
The Consolidated Telephone Construction and Maintenance Co.—For the general excellence of their exhibits.
Saxby & Farmer.—For their railway signals.
R. Johnson & Nephew.—For their iron wire exhibit.
F. Smith & Co.—For their iron wire exhibit.
R. S. Newall & Co.—For the general excellence of their exhibit.
W. T. Glover & Co.—For the general excellence of their exhibit.
Phillips Brothers.—For the general excellence of their exhibit.
Professor Monnier.—For his detector and analyzer of fire damp.
J. W. Gray & Sons.—For the excellence of their exhibit.
Sanderson & Co.—For the excellence of their exhibit.

BRONZE MEDALS.

Binko & Co.—For their improved agglomerate battery.
E. Dent & Co.—For their non-magnetizing watches.
E. Paterson
G. Skrivanoff.—For his dry battery.
R. Webster.—For his non-magnetizing watches.
Roth, Schlaefli & Co.—For their electric self-winding clocks.
J. F. Pratt.—Class X.
H. Whiteside Cook.—For his electric governor for screw marine engines.
Arnold & Sons.—Class X.
L. H. Borrell.—For electric self-winding remontoire clock.
T. R. Brailsford.—For water-level indicator.
J. Storer.—For electrical table fountain.
J. Willing.—For electrical signs.
B. Verity & Sons.—For brasswork.
G. Hawkes & Co.
Zanni & Co.
E. Müller.
E. Blouzon.
C. R. Goodwin.
Mignon & Co.
J. E. Liardet.
A. R. Sennett.
J. H. Athole Macdonald.
Philadelphia Dynamic Co.
Alfred Apps.
J. E. & S. Spencer.
Julius Sax.
W. Groves.
Doulton & Co.
Automatic Telegraph Co.
J. Davis & Co.
School of Submarine Telegraphy.
Electric Railway Signal Co.
G. C. Lewis & Son.
Waterlow & Sons.

W. GARDINER,
Crystal Palace, July 24th, 1882. Secretary.

New Method of Working Long Telegraphs.

In working long telegraph circuits where an automatic translator or repeater cannot be employed between two sections for the purpose of forwarding a message from one section to the other, it is customary to employ a clerk or operator to receive and write down the message arriving on one section and then pass it to another clerk who transmits it over the next section. In this process a great deal of valuable time is wasted by the writing of the message at the intermediate station, and a new system of personal translation has been introduced by Sir James Anderson and Mr. Benjamin Smith, of the Eastern Telegraph Co., to avoid this delay and facilitate the despatch of traffic by transmitting it direct while it is being received. Briefly described, it consists in causing the clerk who receives the message from one section to send it at the same time over the next section; so that while he is reading the message from the receiver as it comes he is also re-transmitting it further on its way, thus playing the part of a human relay or repeater as distinguished from an automatic relay. The new system, which has been already adopted on the submarine lines of the Eastern, Eastern Extension, and South African Telegraph Companies, has many advantages over the old system of working. These are in point of despatch of traffic, accuracy of transmission, and economy of labor and apparatus. First, with regard to despatch of business, the time at present lost in writing down the message received by one clerk, say from station A, and passing it to another clerk to be transmitted over the next section to station C, is entirely saved, for the clerk who receives it from station A is all the while transmitting it to station C himself, and thus the message gets to station C in the same time that by the ordinary system it takes to reach station B, thus traversing two sections of the line in the same time as is ordinarily occupied in traversing one. Greater accuracy of sending is insured by the fact of there being no intermediate copying of the message; and the clerk can give his whole attention to the reading and re-transmitting of the message. Further, by means of this direct personal translation, one clerk suffices to do the work of two in working lines by the simplex method; for instead of having one clerk to receive and another to transmit, the same clerk both receives and transmits simultaneously. Thus the translating station can be manned by half the usual number of operators. Where the duplex method of working is employed there is still a greater saving of labor, for ordinarily six clerks are necessary to work two duplex circuits, namely, three to each section, one to receive, one to transmit, and a third to look up errors for correction, so that the others may continue at their proper duties uninterruptedly. By the new system of Messrs. Anderson and Smith these six men are replaced by two, each receiving from one section and transmitting to the next without delay. A very much smaller staff is therefore necessary at intermediate stations, and a saving is effected in the expenses of the *personnel*, as well as in stationery and apparatus.—*Engineering.*

"Johnny," said the teacher, "a lie can be acted as well as told. Now if your father should put sand in his sugar and sell it he would be acting a lie and doing very wrong." "That's what mother told him," said Johnny impetuously, "and he said he didn't care a damn."

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National Telephone Convention.

In our issue of August 15th we called the attention of our subscribers and readers to the approaching annual meeting of the "National Telephone Exchange Association," which takes place on September 5th and following days.

It will be remembered that the initial meeting of this association, at which organization was effected, occurred at Niagara Falls, N. Y., in September, 1880.

On account of the great pressure of business which came before the association at that time, it became necessary to call a second meeting, which took place at Chicago, in April, 1881.

The third meeting of the association was in September, 1881, at Saratoga, and will long be remembered by those present, by reason of the phenomenal appearance of the atmosphere on the second day of the convention—the so-called "yellow day."

It is expected that the coming meeting of the association will be second to none in interest, since the subjects to be discussed are of paramount importance to all concerned; while the fact that Boston, the political center of telephony, is chosen as the place of meeting, itself lends additional consequence to the affair, and will tend to secure perhaps the largest number of telephone men ever convened at one time and in one place.

The discussions which will take place upon the different subjects canvassed, will doubtless render it conclusively evident that during the year the progress of telephony, whether contemplated from an electrical or a business point of view, has been rapid and decided; and that it can never be truthfully said of telephonic research, and of the telephone business as a whole, that it moves on hinges instead of wheels; and that, while always in motion, it makes no progress.

The programme of the convention, while in a measure to be determined in its details by the action of the delegates, will be generally as follows:

Commencing on Tuesday, September 5th, the convention will probably devote Tuesday and Wednesday to hearing the reports of the several standing committees, to discussion of the same and to taking action thereon, with any other business that may properly come before it.

A marine excursion down the harbor and along the coast will be in order on Thursday, and will be given by the American Bell Telephone Company; while, on Friday, Eugene F. Phillips, the enterprising and public-spirited wire manufacturer of Providence, R. I., will hold his annual picnic and clambake, and expects the delegates *en masse* to attend the same. For three years past this entertainment has been given to the telegraphic and telephonic fraternity of the vicinity. The clam bake of '82 will certainly be the crowning event of the series, and the additional number of guests, it is anticipated, will but add new glories to Mr. Phillips' fame as a host, and a new zest to those participating in and enjoying his hospitality.

The business of the association will be transacted at the hall of the Vendôme Hotel, where arrangements have been made for the first-class accommodation of delegates, at reasonable rates.

The "Compania Electrica de Cuba" had two hundred and twenty subscribers connected and working in the Havana Central Telephone office, July 15th. The officers are:

Gen'l Anson Stager,
F. M. Delano, Esq.,
Geo. M. Phelps, Esq., } New York.
Manager, Mr. V. T. Butler.
Engineer, Mr. H. M. Gardner.

The service rendered was satisfactory to subscribers, and the business successful.

We are pleased to note the following advancement of our esteemed correspondent, Mr. R. G. Brown, now residing in Paris:

[From Le Figaro (Paris), August 8, 1882.]

We learn that Mr. R. G. Brown, engineer-in-chief of the "Société Générale des Téléphones" and corresponding member of the Scientific Society of Marseilles, has just received a diploma d'Officer d'Acadamie, Paris."

This distinction is merited, and one which we applaud.

We have the pleasure to announce to our Telephone friends that a full and complete report of the Telephone Convention at Boston and of all matters concerning it will be prepared specially for this journal by our esteemed correspondent Mr Thos. D. Lockwood, of Boston, whose report of the above will not be found in any other journal.

Among the Division Engineers engaged in the building of the Mexican Central Railroad, is Mr. H. L. M. Blake, brother of Dr Blake of transmitter fame. Mr. Blake, wearing a Mexican suit, and with broad sombrero and spurs and mounted on a cavorting little Mexican horse was seen a few days ago in Guanajuato, on his way to his headquarters at Silao, twelve miles away.

Mr. W. E. Huntington, of New York, with his wife and three children arrived July 16th at Vera Cruz, Mexico, en route to the City of Pueblo, where he takes charge at once as General Manager. Mr. Huntington and party were well.

The following named gentlemen comprise the officers of the National Telephone Association: President, Geo. L. Phillips; Vice-President, Wm. H. Eckert; Secretary, Morris F. Tyler; Treasurer, Charles L. Mitchell. Advisory Committee: For three years, W. D. Sargent; for two years, C. S. Beardsley; for one year, Geo. C. Maynard. Executive Committee: Geo. L. Phillips, Edw. J. Hall, Jr., Henry Metzger, C. N. Fay, Geo. L. Wiley. We hope that the members from this district will be able to hold out sufficient inducements to convince the association that New York City would be an excellent place to hold the next meeting.

Familiar Talks About Electricity and Magnetism.

No. 4.

There is nothing extreme or radical in the idea that the molecules of a solid body can be changed in their positions, or re-arranged, by causing it to connect the opposite poles of a battery; and that when the molecules *are* thus altered, the qualities of the solid or body, which is composed of them, are greatly changed and modified.

All nature bears testimony to the fact, that we cannot alter the arrangement of any mass, without producing corresponding changes in the qualities of the mass built up of such molecules. The action of the molecules (or since molecule is rather a scientific word, let us say "particles") in a wire connected with a battery or other source of electricity, has been compared to the action of a pile of bricks set on end near to each other; strike the first one smartly and it will fall, striking the next which in turn will fall, communicating motion to the third, and so on. So we can picture to ourselves an innumerable number of particles, all normally standing upright in an iron wire, but tending when connected with a battery to place themselves horizontally, and the motion with its attendant phenomena is rapidly transferred immense distances.

If the wire is large and the moving force not too strong, this tranference is accomplished easily. If the wire is too small for the force, or if its particles are not first-class conductors, or in other words, if they are packed too densely together, or not densely

enough; if, for example, we affix a strong battery to a very fine wire of platinum, the molecules we can suppose have not room to turn round without considerable friction against one another, and the result is heat.

If we increase the strength of our source of electricity, our wire becomes so strained that it is rendered absolutely incandescent by the heat developed. We have produced the incandescent electric light.

It was once thought that only liquids or gases have the mobility or elasticity requisite for molecular alteration, but that notion is now universally abandoned. Why should we think such a thing as the particles of a mass of iron having a capacity of re-arrangement as being impossible, when every warm day we can go out and see a rail on a railroad lengthen a full inch? When we know that an iron tubular bridge, like the Victoria Bridge at Montreal, varies in length upwards of a foot in the twenty-four hours of a summer day?

To take another illustration, we may liken the telegraph wire when not connected with a source of electricity, to a thread strung full of purple beads, like a necklace; when the wire is connected with the battery we may imagine each purple bead separating into a red (positively electric), and a blue (negatively electric) one; the whole wire now presenting a complete alternation of red and blue beads, coalescing again into the purple beads when the battery connection is interrupted.

We thus see, according to this idea, that a conducting wire connecting the poles of a battery, merely arranges its own particles from end to end, in so many alternate electro-positive and electro-negative molecules. It is polarized.

The oldest, and until the present century, the most important method of developing electricity, was that which consisted in the friction of two non-conducting substances, when electricity of a positive character would appear upon one of the substances and that of the negative sign upon the other. The utmost advances in the science only extended for many centuries sufficiently far to improve the apparatus used in the production of electricity, for instance, in the successive applications of the cylinder machine, the plate machine and the electrophorus.

During the last few years of the eighteenth century, the researches of Galvani and Volta proved that other sources of the mysterious power existed, and in 1802 the latter philosopher constructed his pile, which, however, although a very few persons know it, was anticipated by a Scotchman named Robison.

Electricity is also developed in the atmosphere, and may be produced or exhibited by certain animals, such as the electrical eel or gymnotus and the torpedo.

Magnetism, it was discovered in 1831 by Faraday, could be made to originate electricity, as we shall see hereafter; soon, also, it was ascertained by Dr. Seebeck, that electricity could be obtained by the application of heat to the soldered junction of dissimilar metals; and in 1840 the accidental discovery was made that high pressure steam escaping also operated to generate electricity; so we may see that electricity is by no means inaccessible, but may be derived from many sources and in many ways.

There is a report afloat that Mr. John Pender, M. P., the man who really controls the cable systems of the world, is on his way to this country. When Mr. Gould began to lay his cables, he was opposed in every way by Mr. Pender; but it was soon found that in telegraphy, as in everything else, unity means strength. So Messrs. Gould and Pender buried the hatchet, the transatlantic cables were placed under one management, and Western Union blanks are the only ones to be found at the cable offices. For a long time Mr. Gould has tried unsuccessfully to place the Western Union stock upon the London market. It is believed now that Mr. Pender and another English capitalist will be given places in the direction of the Western Union, and will upon their return to London use their influence in obtaining the coveted listing. If this programme is carried out, there can be little doubt but that Western Union will soon become a favorite investment with our English cousins, who appreciate a 6 per cent. stock representing an almost absolute monopoly. The minor investing classes in England, consisting mostly of women, parsons, doctors and lawyers, are always on the look-out for investments which will return them higher interest than they can get in consols. Besides, the telegraphs in England belong to the Government, and any telegraph stock will seem to the ordinary English mind to have something of the security which belongs to Government bonds. So that if Mr. Gould carries out his scheme, there is every probability of a sharp rise in the Western Union stock, which the American investor is shy of on account of its heavy watering, as well as on account of its representing nothing more substantial than wires and poles.

"Telephone Troubles."

We are indebted to General Superintendent Carson for a little pamphlet entitled, "Telephone Troubles and How to Find Them." It is published by Mr. C. H. Haskins, of Milwaukee, Wis. We find in it much timely and useful information which no one knows better how to impart than Mr. Haskins; he is too well and favorably known to the Telephone fraternity to need any comment from us in his favor. We think his pamphlet should be in the hands of every manager and employee of telephone exchanges throughout the country.

A New Telephone Co.

On Tuesday last a contract was concluded between the Bell Telephone Company of Boston and the Honesdale Bell Telephone Company, whereby the latter secured the exclusive privilege of the use of the Bell system in Honesdale and adjacent towns. The Honesdale Company is composed as follows: J. Merrihew, of New York, Ass't. General Supt. of the Western Union Telegraph Company; H. L. Storke, President of the Hudson River Telegraph Company, and the Empire State Telephone Company; Richard O'Brien, of Scranton, Supt. of the Western Union Telegraph Co., and Charles Peterson, of Honesdale, Supt. of the Del. & Hud. Canal Co.'s Telegraph lines. The company will proceed to work immediately, and besides wires for town and suburb accommodation, will establish a line first to Hawley, and then to Prompton, Waymart and other towns in this vicinity. The exchange office will be in rooms fitted up for that purpose in the Petersen Building. The enterprise is in good hands, and we hope may prove a good investment to the projectors, as well as a great convenience to the public.

The Faure Storage Battery.

The Light and Force Company, of No. 234 Broadway, controlling the Faure patents upon the lead storage battery or accumulator, announce that upon the appearance of the first Brush storage battery in the market suits will be begun to prevent their introduction. The Light and Force Company claim a monopoly of all the storage batteries in which lead plates and minium are the essential parts, and will contest any device having these features. The company is making preparations to light up a railroad train on the Pennsylvania Railroad with their batteries, and a branch organization in Boston is preparing to light houses with Edison lamps fed by storage batteries. Mr. Edison is making a special lamp for use in connection with such batteries.

Electric Lighting in the Royal Aquarium.

We understand that a prize of 100 guineas is to be offered for the best and most durable system of incandescent electric lighting in the forthcoming exhibition, to be held at the Royal Aquarium. Each competitor is to be limited to 100 lamps, and those are to be kept in action during the whole time the exhibition is open. Tests on each system will also be taken at intervals. We believe that it is stipulated that when each installation is fairly started no part of it shall be subject to any additions or alterations unless duly reported.

We are gratified to note the promotion of W. H. Eckert, Esq., General Manager of the Cincinnati Telephone Company, to the same position in charge of the Metropolitan Telephone Company of this city. His achievement in establishing one of the best telephone systems in the country at Cincinnati is a sufficient guarantee that he is abundantly qualified to fill the new and trying position he has undertaken here, and we wish him every success.

We are informed that Mr. Joseph Christie, the well-known writer, has severed his editorial connection with the *Operator*. We should be sorry to see one who has won so much in the literary field lay aside his pen altogether, and trust that the spirit will move him to furnish an occasional article to the columns of the REVIEW.

Mr. John H. Young, who has been with the Western Union Company here for many years past, sailed on Monday on the Savannah steamer, intending to locate permanently at Lake City, Florida, in the cable service. Mr. Young is accompanied by his wife.

Mr. John Applebaugh, who has been a receiver on the first floor in the cable department for eight years past, has resigned, and goes into the advertising business with Dumont & Applebaugh, of which firm Mr. W. K. Applebaugh, a former telegrapher, is a member.

In a lecture recently delivered before the Glasgow Scientific Association describing this as the electric age, as early periods were distinguished as the stone age, the iron age and the bronze age. Mr. Preece referred to the application, in this country, of the electric force in relation to fire. In Chicago he had learned that at the corner of nearly every street there were fire-alarm boxes which sent a current, indicating the locality of the fire, to the central station. The same current released the harness of the horses, and every horse is so beautifully trained that it ran into position. The same current whipped the clothes off every fireman in bed, drew a trap-door, down which the man slid into his place on the engine, thus dispatching the brigade in something less than six seconds.

Removing a Shell from a Gentleman's House.

ALEXANDRIA, Aug. 8.—A humorous incident happened yesterday. A gentleman wrote to the Admiral complaining that there was a shell belonging to the Inflexible in his drawing room, and requesting its removal. The Admiral passed on the letter to the captain of the Inflexible, who sent on shore the boatswain and half a dozen seamen, who found the great shell lying, unexploded, in the drawing room, as described. As it would have been dangerous to bump it about, a device was, after some consideration, hit upon for conveying it to the shore. A feather bed was procured, and the shell firmly enveloped in it. It was then carefully rolled down stairs, and so back to the ship.

The Western Union Telegraph Company.

DIRECTORY AND STAFF.

"The past and present success of a business enterprise, and its security for the future, are indicated always by the class of men directing its policy and employed in the administration of its affairs. If judged by this standard the Western Union Telegraph Company must take high rank. Its board of directors includes a larger number of wealthy and successful men than can be found at the council table of any other company in this country, or indeed in the world. It comprises twenty-nine members, and is most thoroughly representative of the varied financial and commercial interests of the country. Aside from the individual worth of these directors, estimated at from three to four hundred millions of dollars, they administer and control interests representing in the aggregate infinitely greater sums, employed in all the methods of transportation, and in every mercantile pursuit. In short, with a few exceptions, the Directory is a body of magnates such as has never before been got together in the management of one enterprise.

In order that the reader, especially from abroad, may perfectly understand who these gentlemen are, their names are herewith inserted:

Norvin Green, President of the Company.

Thomas T. Eckert, Vice-President and General Manager.

John Van Horne, Vice-President of the Company.

John B. Van Every, Acting Vice-President and Auditor.

D. H. Bates, Assistant General Manager.

Edwin D. Morgan, ex-Governor State of New York, Capitalist and Merchant.

Augustus Schell, Capitalist and Director New York Central R. R. Co.

George B. Roberts, President Pennsylvania R. R. Co.

C. P. Huntington, President Central Pacific and Chesapeake and Ohio R. R. Co's.

Sidney Dillon, President Union Pacific R. R. Co.

Hugh J. Jewett, President of the Erie Railway.

Samuel Sloan, President Delaware and Lackawanna R. R. Co.

Jay Gould, Capitalist.

Russell Sage, Capitalist.

Alonzo B. Cornell, Governor State of New York.

Cyrus W. Field, Capitalist and Director Atlantic Cable Co's.

Edwards S. Sandford, Vice-President Adams Express Co.

James H. Banker, Capitalist.

Robert Lenox Kennedy, Vice-President Bank of Commerce.

J. Pierpont Morgan, Messrs. Drexel Morgan & Co.

F. L. Ames, Capitalist, Boston.

Harrison Durkee, Capitalist.

Edwin D. Worcester, Treasurer New York Central R. R. Co.

W D. Bishop, ex-President New York, New Haven and Hartford R. R. Co.

Zalmon G. Simmons, Capitalist, Kenosha, Wis.

Amasa Stone, Capitalist, Cleveland, Ohio.

George J. Gould, Capitalist.

Chauncey M. Depew, Director New York Central R. R. Co.

J. W. Glendinning, President Acadia Coal Co.

Erastus Wiman, President Great North-Western Telegraph Co. of Canada.

The staff off employés is an exceptionally strong one, owing largely to the fact that the rapid growth which has taken place in the business itself so rapidly, within the past generation, has developed in the highest degree the capacity of the men engaged in carrying it forward. Thus, nearly every individual on the staff has had some peculiar training to fit him for the task in hand; while a majority of them engaged in the direct administration of its affairs, have had an enlarged experience of the highest and most varied kind to qualify them for the positions they occupy. This is especially true of Dr. Norvin Green, the President, who has spent a lifetime in the most complete devotion to the advancement of telegraph interests, and whose wisdom and experience are well known and appreciated. Associated with the president is General Eckert, the able administrator of the details of the business. General Eckert was Assistant Secretary of War during the Rebellion, and greatly distinguished himself by his ability and vigor in this important position at the most critical period in the history of our country. He is most ably seconded by Colonel Clowry, who is located at Chicago, and whose district comprises fully one-half of the entire continent. A corps of assistants and local managers, whose loyalty and confidence the general manager has won in a marked degree, supplement him at every point. The company is thus singularly fortunate in possessing the best administrative skill in every branch of its business, whether among its army of operators or in the financial, construction, or maintenance departments. While, on the one hand, it would be impossible to obliterate a staff and organization so complete for the purpose in view, it would on the other be equally impossible to duplicate it, even after long years of growth and experimenting, and at an expenditure such as no sane body of capitalists would for one instant contemplate."

The Jablochkoff Electric Motor.

M. Paul Jablochkoff, the well-known inventor of the electric candle, and a leading pioneer in electric lighting, has invented a new motor and dynamo electric generator, which promises good results in point of economy. It is based on a neglected principle in electro-dynamics, and it is stated that it can be manufactured for a mere fraction of the expense now required for existing machines. This fact alone is of high importance to the future of electrical engineering. The motor is also said to be very simple in its action. We are not at liberty yet to publish a description of it, but expect to do so on a future occasion. Mr. Robert Sabine, C.E., consulting electrician to the company, is at present engaged in testing its capacities. The motor will become the property of the Jablochkoff Electric Light and Power Company in this country.—*Engineering.*

Friction and Electrolysis.

The electro-motograph of Mr. Edison has attracted the attention of physicists to a new fact, namely, the variation of friction between a metal surface and an electrolyte, when an electric current traverses the points in contact. In 1879, M. Koch (Wiedemann's Annalen, No. 9, p. 92), showed that polarization by oxygen altered the rubbing surface of platinum or palladium in such a manner as to increase the friction. Polarization by hydrogen does not produce, according to him, any effect. These experiments have been repeated by M. Krouchkole, an assistant of M. Jamin, in a different manner, and he finds that polarization by oxygen increases the friction whilst polarization by hydrogen diminishes it. Platinum brushes were caused to rub upon a turning surface of glass moistened with dilute sulphuric acid. The current from a single Daniell cell was passed across the rubbing contact. The other electrode consisted of a copper rod plunged in a solution of sulphate of copper, an electrode which, according to M. Lippmann, is impolarizable. The platinum brushes are connected to a delicate balance, whose needle indicates the pull upon them. It is thus easy to show by the deflection of the needle that polarization by oxygen increases the friction between the platinum and glass, whereas polarization by hydrogen diminishes it.

The Edison Electric Light.

The tests undertaken by Mr. Edison upon the completion of the street work and station in his first down-town electric light district, bounded by Spruce and Wall streets, Nassau street and the East River, have been finished to the entire satisfaction of the experts employed by the company, who find the result better than was hoped for. The dynamos in the station at Pearl and Fulton streets have been working this week, and everything is in readiness to sell light as soon as the lamps are in the houses. An unexpected delay occurred in getting the brackets, which were to have been furnished before this. Bergmann & Co., the manufacturers of these fixtures, began delivering them yesterday at the rate of one hundred a day, and they are at once placed in position. As soon as 3,000 are in place the current will be turned on from the central station. Major Eaton, of the Edison Company, will fix no day for this event, but expects to "light up" by the 20th of September, at the latest. A gang of men is still employed making connections between the street mains and the house wires. The greatest use of the electric light in any one building down town will be in the Mills Building, at Broad street and Exchange Place, which has been "wired" for 5,500 lights. The work was done at Mr. Mill's expense by the Edison Company's men.

In answer to the many reports of failure, of unforeseen obstacles, of work done for stock-jobbing purposes Major Eaton requested a reporter of the *Evening Post*, who called upon him yesterday, to say that these reports are false in every particular. The company is working as hard and as fast as it can to furnish New York with a practical and economical electric light, and is spending a vast deal of money. So far the results are perfectly satisfactory to the managers.

With regard to the rumors of important patent suits between the different companies making incandescent electric lamps, the Edison Company claims a monopoly of the business upon the following grounds: That it has patents covering (1) a continuous conductor, the light-giving filament forming part of the circuit; (2) a filament of carbon; (3) high resistance—something never before obtained; (4) metallic "leading in" wires, ending in a clamp-like connection with the carbon; and (5) a process of manufacturing indispensable to the production of all and any of the incandescent lamps now in the market. When the Swan light, which the Brush Company is preparing to put upon the American market, is offered for sale, the Edison Company will begin suit for infringement, and also against the United States Electric Light Company, should the Maxim lamp interfere with the business of the Edison Company.

During the last month the Edison light has been introduced in Everett's two hotels, one at No. 84 Chatham street, and another at No. 98 Barclay street, where it can be examined by the public. Two hundred and fifty lights are used in each place.

Ozone from Oxygen.

A French chemist, Dessan, has made a discovery in respect to the action of light that is likely to prove very important. He has found that oxygen may be converted into ozone by the action of light rays. In making his experiment, Dessan employed very pure oxygen; it was contained in a glass globe, which, together with the other apparatus, was carefully covered with black paper to prevent the admission of light. In these circumstances, the oxygen did not betray the presence of ozone; but, after the rays

from a Drummond oxyhydrogen lamp had shone upon the oxygen for twenty-five minutes, ozone was distinctly shown to be present on testing with iodide of starch.

On Double Refraction in Glass and Sulphuret of Carbon occasioned by Electric Influence.

By H. Brongersma.

The author has re-examined the phenomena first observed and described by Kerr in his memoirs on "A New Relation between Electricity and Light," (*Phil. Mag.*, 1875, p. 337), chiefly because certain physicists have failed to obtain the same phenomena as far as solid bodies are concerned. He found, however, that the doubts as to the correctness of Kerr's results are unfounded. If explanations based upon the supposition that electricity produces these phenomena in an indirect manner are not confirmed by an experimental examination, it becomes more and more probable that we have here to do with a hitherto unknown action of electricity upon the luminous vibrations. —*Wiedemann's Annalen.*

A Galvanic Element.

By Kuhlo.

The earthenware cylinder of a Daniell's element is replaced by a tube of parchment paper, which is fixed by means of india-rubber rings to a cylindrical frame of an insulating material consisting of a bottom plate and superimposed rods, connected above.—*Electrotechn. Zeitschrift.*

Chromic Acid Elements.

The zinc plate is laid on the bottom of the cell, or preferably zinc amalgam is put into a shallow beaker, as the solutions of chrome, alum and sulphate of zinc, being heavier, sink to the bottom and do not attack the zinc.—*Wiedemann's Beiblatter.*

Luminous Photographs.

A film is made of perchloride of iron and tartaric acid on a surface of softened glass; when it has been exposed, sulphide of calcium rubbed to a very fine powder through a sieve, is dusted over it. The image is formed in the same way as if it had been dusted with any other powder, and it can then be transferred to paper.

The Electric Light at Edinburgh.

An exchange says, after the unfortunate mismanagement of the electric light in Edinburgh as a street illuminant, it is gratifying to learn that the installation made twelve months ago at the Waverly station of the North British Railway Company has been so successful that the company has decided that "the light of the future" shall shed its rays not only over the main portion of the station, but even unto its outermost platforms.

The Financial Results of the Crystal Palace Electrical Exhibition.

According to the report of the Directors of the Crystal Palace in London, the receipts as compared with the corresponding six months last year show an increase of about $95,000.

This showing is certainly favorable enough and should encourage some of our enterprising New Yorkers to undertake something of the kind here this fall.

"Telegraph Messages."

"AN IMPORTANT QUESTION FOR THE OHIO COURTS TO DECIDE."

Editor Review of the Telegraph and Telephone:

Dear Sir,—Under the above heading an announcement is made in your issue of the 15th of August from Dayton, Ohio, to the effect that the Mutual Union Telegraph Co. had commenced proceedings in the courts there to compel the Western Union Telegraph Co. to accept and transmit dispatches offered to it by the former. I would suggest that this question has already been decided by the Supreme Court of Ohio *State ex rel.* vs. *Telephone Co.*, 36 O. S. page 296, in which case the Court granted a peremptory writ of mandamus compelling the Columbus Telephone Co. to place a telephone in the office of the American Union Telegraph Co. for the use of the B. & O. R. R. Co., in face of a contract between the Telephone Company and the Western Union Telegraph Co. by which it was agreed the latter should have the exclusive privilege of the telephone instruments as against all other telegraph companies. Chief Justice McIlvaine in rendering his decision in the above case, as it seems to me, fully discusses the law governing the Dayton cases.

The laws of Ohio regulating magnetic telegraph companies will be found in the Revised Statutes of Ohio of 1880, Sections 3,454 to 3,470, and Section 3,471 provides that the same statutes shall apply to telephone companies. Section 3,462 as amended April 15th, 1880 provides that telegraph companies "Shall receive dispatches *from and for other telegraph lines* and from any individual," and on payment of charges, etc., "shall transmit the same with impartiallity and good faith under penalty," etc.

In construing this section of the statutes the learned Judge holds that the word individual is used in the sense of person and embraces artificial or corporate persons as well as natural, and that "dispatches so received, 'from or for,' must be transmitted with impartiality, that is, without discrimination, either in respect to persons or in the time or manner of transmission." And further such companies cannot shield themselves from the performance of their statutory duties behind any "self-imposed restrictions" contained in contracts with other parties. The fact that the Mutual Union represents (if it so does) that it can do *all* the business of its patrons, is a matter between those patrons and itself and no affair of the Western Union further than that company may be a patron of the Mutual Union. Telegraph and telephone companies like railroad, steamboat and express companies are common carriers, and must transact business for all "with impartiality and good faith" upon payment of usual charges. For one corporation to refuse its services to another and allege as a reason for such refusal, the inability of its cotemporary to discharge its engagements without assistance from a similar organization is to take advantage of its own wrong, in as much as the original contract was properly predicated upon the fulfilment of all legal duties by co-ordinate companies. Express companies solicit business and promise to carry packages to all parts of the globe without having control of a rail of iron or a plank in a vessel. What folly it would be in a railroad company to refuse to accept freight from them on the ground that the express company was not able to fulfill its contracts by means of its own conveyances! Public corporations cannot bar out legitimate competition in this way. B.

Knight's New American Mechanical Dictionary.

Under this title, Houghton, Mifflin & Co., Boston and New York, publish a fourth, or supplementary volume, of the well-known work. Since the first three volumes were issued in 1877, the march of improvement has made the present book not only useful, but absolutely necessary. In glancing through the columns of the first part—A to C—we find a large number of articles bearing on electrical matters, a few important ones of which may be mentioned: Accumulator, Alloys, Alluminum, Asbestos, Amalgamation, Automatic Repeater and Switch, Astatic Galvanometer, Bamboo, Bell Magnet and Telephone, Binding Post, Block System, Bolata Gum, Brex Relay, Break Circuit, Burglar Alarm, Buzzer, Cables, Call, Annunciator, Bell and Button, Caoutchouc, Carbon, Battery, Button, Candle, Clamp, Telephone and Zinc Connector, Cation, Celluloid, "C. G. S.," Circuit Breaker and Closer, Coil, Commutator, Conductivity, Conductometer, Contact Breaker, Core, Coulomb, Couronne de Tasses, Crown Telephone, Current and Regulator. Of Telegraphic systems mentioned, we have Acoustic, Ærial, Air, Autographic, Autokinetic, Automatic Printing and Signal Bell, Cigar Box and Copying. The following batteries are fully described: Æriated, Agglomerated, Alum, Aluminum, Anderson, Bagration, Balloon, Becquerel, Bichromate, Breath, Bunsen, Byrne, Callan, Calland, Camacho, Carbon, Carre, Cantery, Chloride of Lime, Silver and Tin, Chromic Acid, Clamond, Column, Constant and Cruikshank. The work is published by subscription in four sections, at two dollars a part. It contains some 3,000 engravings, many of which are full page, and in size is 1,000 pages quarto, well printed on thick, calendered paper. The second part, soon to issue, will contain voluminous articles on Dynamo Machines, Arc and Incandescent Lights, Cumming Disc Electrodes, and numerous other electrical appliances. One of the new features introduced is a system of copious indexical references to technical journals published in the last half decade. By this means the reader can with little trouble obtain a general knowledge of any given subject. The author, Edward H. Knight, A. M., LL.D., has attained unto considerable prominence as a member of many scientific societies, and was commissioner to numerous International Expositions. He is, therefore, in a position to be well informed on all the subjects treated in the dictionary.

Facts About the Bridge.

THE MAKE-UP AND STRENGTH OF ITS CABLES AND THEIR GRIP ON THE ANCHORAGES.

The construction of the East River Bridge was begun January 3, 1870. The length of the river span is 1,595 feet 6 inches. The length of each land span is 930 feet. The length of the Brooklyn approach is 971 feet. The length of the New York approach is 1,562.6 feet. The total length of the bridge is 5,989 feet. The width of the bridge is 85 feet. The number of cables is 4. The diameter of each cable is 23¾ inches, and each cable consists of 5 306 parallel steel wires No. 7 gauge, wrapped to a solid cylinder. The ultimate strength of each cable is 12,000 tons. The depth of the tower foundation below high-water in Brooklyn is 45 feet. The depth of the tower foundation below high-water mark in New York is 78 feet. The size of the towers at high-water line is 140 feet by 59 feet, and at the roof course is 136 feet by 53 feet. The total height of the towers above high-water mark is 277 feet. The clear height of the bridge in the center of the river span over high-water is, as computed by the bridge engineers, 136 feet. The height of the floor at the towers above high-water mark is 119 feet 3 inches. The grade of the roadway is 3¼ feet in every 100 feet. The size of the anchorages at the bases is 129 by 119 feet, and at the top 117 feet by 104 feet. The weight of each anchor plate is 23 tons.

Telegraphic and Telephonic Notes.

The National Telephone Exchange Association.

SECRETARY'S OFFICE, NEW HAVEN, CONN.,
August 20th, 1882.

To the Telephone Exchanges of the United States:

The fourth meeting of the National Telephone Exchange Association will be held in the City of Boston, Mass., on Sept. 5th, 6th, 7th and 8th. The headquarters of the Association will be at the Hotel Vendome, on Commonwealth Avenue. Arrangements have been made by which accommodations may be had at this hotel, on the following terms: One person, single room with both, $4 00 per day. Two persons in one room, with bath, $3.00 each per day. Members will please address Col. J. W. Wolcott, Vendome Hotel, Boston, Mass., stating what rooms they will require. Rooms had better be secured in advance.

The meeting will be called to order at eleven o'clock A. M., Tuesday, September 5th. There will be two sessions each day on Tuesday and Wednesday. The first business before the Association will be the election of officers for 1882-3, and the election of new members. The remainder of the sessions will be occupied by reports from the various standing committees, and discussions thereon. Sufficient returns have not yet been received from the chairmen of the different committees to enable the Secretary to give a detailed programme. On Thursday, the 7th, the Association will be tendered an excursion down the harbor and dinner by the American Bell Telephone Co. On Friday, the Association will be the guests of Eugene F. Phillips, Esq., of Providence, R. I., at a clam-bake at Squantum, R. I.

The committee of arrangements have been unable to secure any reduction of rates from the railroads, except by promising a certain number of fares from a place. Members will therefore have to avail themselves as best they can of summer excursion rates, or whatever accommodations are offered the general public. Please notify the Secretary if you intend to be represented at the meeting, with the names of your probable representatives.

MORRIS F. TYLER,
Secretary.

Mr. C. W. H. Verster, of Rotterdam, Holland, our correspondent for Holland, will furnish our readers some interesting electrical news for our next and the following editions.

Hearing the Aurora by Telephone.

An observer of the recent aurora at Mont Clair, N. J., August 4, writes that on connecting the two poles of his telephone, one with the water pipe leading to cistern near his dwelling, and one with the gas pipe leading all over town, he heard the electrical crackle going on, substantially the same as heard when the same connection is made during thunder storms. He however reports that the auroral crackle was more delicate in its sound than the thunder-storm crackle, and that besides the crackle there were at intervals of perhaps half a second each, separate short taps on the telephone diaphragm that gave a slight ringing sound.

Send Us a "Telepheme."

We shall ask a dispensation to permit us to introduce a new word into the language. It is *telepheme*. The use of such phrases as "telephonic communications," "telephonic message," "news by telephone," and the like, seems a little clumsy, and a single word expressing their meaning has become a desideratum. We submit "telepheme" as a word properly made from the Greek, and a vocable which will conveniently serve our hurrying speech. Its formation is analogous to "telegram," the termination in both cases representing the result of the verb's action. Thus, "to telegraph" is to write from a distance, and a "telegram" is that written from a distance. The new word "telepheme" is similarly made.—*Rochester Post-Express.*

It is stated that good service was rendered by a young midshipman on board one of the ironclads off Alexandria, who, stationed in the maintop, was able to watch the effect of each shot on the forts, before the view was intercepted by the smoke from the guns, and report to the gunners, who regulated their aim accordingly. Mr. Coxwell, however, suggests that still better work could have been done by means of captive balloons, allowed to ascend from the deck of a vessel moored out at sea, out of range of the forts, and connected with the deck by means of telephone, not only could the course of the bombardment have been closely watched, but the proceedings of the army and people on shore could have been easily descried, and Arabi's abuse of the flag of truce might have been frustrated.

Telephony in Great Britain.

The Postmaster-General has at length decided to grant licenses to different companies to establish and operate telephonic exchanges throughout the Kingdom. This license confers no special power to erect poles and wires on or under any public highway or private property. Licensees will have to make their own arrangements with the local authorities, and any persons whose property may be affected. Nor does the license confer authority to carry on telephone business with any instrument which is an infringement of existing patent rights. This result will cause general public satisfaction, as there has been a growing feeling of late that the charges of the company now possessing exchanges are higher than is desirable. Competition will have the effect of reducing these rates. Already we hear of at least one opposition company about to appear, and doubtless others will in time follow. In connection with this subject we notice that the disclaimer of the phonograph from the Edison telephone patent has been allowed by the Attorney-General.—*Exchange.*

The Amplitude of Telephone Vibrations.

The amplitude of the vibrations of a Bell receiving telephone have been ingeniously measured by M. G. Salet. To the iron diaphragm of a Bell telephone he fixed a little disc of glass weighing 0.45 grammes, and in front of it placed a second, giving a set of Newton's rings by pressure against the first. The arrangement it will be seen resembles Fizeau's plan for studying dilatations. When the telephone is spoken to direct, at a distance of 15 or 20 feet, or when a current is sent through it from a good transmitter, such as Bottscher's, which requires no battery, the rings are seen to lose their distinctness, and disappear if the voice is raised a little. The rings, in fact, vibrate in correspondence with the diaphragm of the instrument, and it is easy to calculate from the displacement of the rings the amplitude of the telephone vibrations. To estimate the displacement of the rings, a turning disc perforated with holes like a phenakisticope, is placed before a receiver which is caused to emit a continuous note. For a certain speed of rotation the rings reappear with distinctness. If, then, one blows through the disc so as to make it act like a syren, one demonstrates that the sound produced is in unison with that transmitted by the telephone. If it is lowered or raised slightly, the rings oscillate, at first gently, then with such rapidity that they become invisible. Whilst they oscillate their displacement can be estimated. In one experiment made by emitting in the transmitter the "la" of the diapason, or the vowel "u" with moderate intensity, the displacement was equal to the distance between two consecutive rings. This corresponds to an amplitude of the telephone plate of from two to three ten-thousandths of a millimeter. When the displacement is not equal to the distance between two rings, the brightness of the ring taking a point of the glass plate as zero, will give an estimate of the strength of current in the telephone.

SAN ANTONIO, TEX., Aug. 14, 1882.

To the Editor of the New York Review:

Several nights since, San Antonio was visited by quite a severe electric storm, although not near so serious as I have witnessed at other places.

At all events, it was the occasion of a trip to the Government depot, where we have a number of telephones, and several systems of electric bells.

It may not be amiss to state that the fifteen buildings comprising the officers' quarters are situated on one of the highest ridges surrounding the town, that they are connected electrically by means of a number twenty phosphor bronze wire (a matter to which I shall presently recur), a water pipe for return circuit, and a sixteen-cell Leclanche battery.

This battery, through the means of push buttons, actuates the bells in all the buildings.

The depot quartermaster has a system of call bells and switches with "speaking tube" telephones, the former operated by a four-cell Leclanche battery, located in his office.

He has also a telephone in his office connected with the exchange, and grounded through a vibrating bell at the Government ice factory, about one mile distant.

This ground wire is also connected with the four-cell battery and a push button, which enables him to signal the factory without disturbing the central office, while at the same time he has the use of the telephone to the former.

The currents generated by the magneto-machines and transmitted by the pole-changer not having sufficient duration to disturb the vibrating bell, make it altogether a very convenient and economical arrangement.

In his residence there is also an exchange telephone and a push button connected with the sixteen-cell battery, and operating a vibrating bell at the corral over a wire, acting in this case also as a ground for the telephone.

In this instance, however, the battery current splits after leaving the button, rings the vibrating bell, and drops the annunciator in the central office, over a resistance of two and one-half miles of number fourteen steel, unless the wire is grounded between the residence and central by means of a plug, which, of course, is done until they are ready to talk.

Every joint, without exception, in both these systems, is thoroughly soldered, as are all the ground wires where they reach the water pipe.

Now, this sixteen-cell battery barely rings an excellent vibrating bell, about two thousand yards distant, on the phosphor bronze line, while the four-cell battery vigorously taps another, nearly a mile distant, on a number nine iron wire.

The lightning, as it usually does when it has the opportunity, had startled the denizens of the hill, and demoralized the ground wire leading through the ice factory.

A great many had heard a tremendous clap, but very few realized how near the shock had been, for only a few yards to the rear of the General's quarters a pole had been split in two and shattered to smithereens.

This pole was one of the number supporting the number nine wire and the factory is only a few yards further on.

Now what struck me as a little peculiar, and I have been so astonished before, was that this lightning should choose the enormous resistance offered by a cedar pole for an exit to the ground instead of following the good conductor a few yards further on and terminating in a large water pipe connected with the city mains.

As it was, only sufficient current followed the line to melt the small electro magnet wire at its junction with a binding screw sunk in a rubber thimble, and, indeed, it is not certain that this discharge was the one that damaged the magnet wire.

I am vividly conscious that the merest tyro in electricity can explain all this, at least as Mr. Lockwood remarks, in a "negative way," but in view especially of some reading on the subject I must express my bewilderment.

I refer to some experiments recently conducted in France by eminent savants (they are all eminent I believe) and possibly many of your readers read of them, wherein it was conclusively proven that a wire of the smallest diameter in use was equally efficient with those of preposterous dimensions in conveying away tremendous charges of the intensest electricity.

Or we can turn to something fresher still, I mean a late article wherein it was stated that the lightning left a lightning rod, owing to its prejudice against bad joints, and jumped over some twenty feet or more to an insignificant telephone wire, possibly, as has been suggested, because it was well grounded.

I wonder if a cedar pole makes a better ground than a water pipe?

Or, respectfully speaking, is not atmospheric electricity slightly inclined to be "bull headed?"

Yet through it all I think I discover a bonanza for telephone men.

We are often asked, is there any danger in this wire during a thunder storm? And I suppose if all the answers that have been elicited could be summed up in book form, they, the authors, would stand aghast at the infinite audacity and variety of their own vagaries.

What I deduce is this, and I think we can safely rely upon it, until, at least, it is disproven, that provided our ground wires are not smaller than number sixteen copper and are efficiently grounded, it will be utterly impossible for telephone lines which are usually of much greater resistance to take in more electricity than the ground wire can safely carry off.

Surely a small pipe cannot bring in more water than a larger one under the same pressure can convey away.

As to its acting as a lightning rod and all that sort of science, we should feel no concern, for it will hardly be claimed that we are under obligations to insure householders against the weird eccentricities or ghastly havoc of wild thunderbolts.

J. K. DUNBAR.

Weight of a Million Dollars.

Mr. E. B. Elliott, the Government Actuary, has computed the weight of a million dollars in gold and silver coin as follows:

The standard gold dollar of the United States contains of gold of nine-tenths fineness 25.8 grains, and the standard silver dollar contains of silver of nine-tenths fineness 412.5 grains. One million standard gold dollars consequently weigh 25,800,000 grains, or 53,750 ounces troy. or 4,479 1-6 pounds troy, of 5,760 grains each, or 3,685.71 pounds avoirdupois of 7,000 grains each, or 1,843-1000 "short" tons of 2,000 pounds avoirdupois each, or 1,645-1000 "long" tons of 2,240 pounds avoirdupois each. One million standard silver dollars weigh 412,500,000 grains, or 859,375 ounces troy, or 71,614.58 pounds troy, or 58,928.57 pounds avoirdupois, or 29,464-1000 "short" tons of 2,000 pounds avoirdupois each, or 26,307-1000 "long" tons of 2,240 pounds avoirdupois each. In round numbers, the following table represents the weight of a million dollars in the coins named:

Description of Coin.	*Tons.*
Standard gold coin	1⅔
Standard silver coin	26¾
Subsidiary silver coin	25
Minor coin, five-cent nickel	100

A SALT BED 115 FEET THICK.—There was completed, July 22, at Marine City, Michigan, a well which passed through 115 feet of solid crystal salt. Salt was encountered first at a depth of 1,633 feet, and from that point to the depth of 1,748 feet the material removed was pure salt.

The Belgian Academies offer a prize of 3,000 francs for the best essay on the destruction of fishes by the pollution of rivers. Competitors will be allowed till Oct. 1, 1884, to send in their papers. Among the topics suggested for treatment are the investigation and indication of practical means for purifying the waters issuing from particular industrial works, so as to render them compatible with the life of fishes without compromising industry.

Thought Rules the World.

It makes no noise, but lives on and reigns when all the bustling and the shouting that steemed to stifle it are hushed, and whilst the great works, which it guided the hand of man to do, have either perished or remained, to tell of pomp and vain glory gone for ever. Thought is with us in the words of wisdom that "shall not pass away," and to which we do well to give heed.

The Telephone in England.

The Postmaster-General has just announced in Parliament that there is not the slightest chance that the English Government will ever purchase the telephone lines. It has, however, made some liberal concessions in permitting the development of the telephone under private enterprise.

The Four Great Ports.

Liverpool ranks as the most important port in the world, with an annual tonnage of 2,647,372; London stands second, with a tonnage of 2,330,688; Glasgow third, with 1,432,364; New York fourth, with a tonnage of 1,153,676. As a manufacturing city New York leads the world.

The contemplated underground railway of Paris is to be 24 miles long including branches and will cost $30,000,000 or $1,250,000 per mile; 10 cents first-class fare, four cents second-class fare, two cents workman's fare, according to the class of the "psssengaire."

A correspondent, who has evidently been reading some weird and startling stories in the *Congressional Record*, wants to know the name of the managing editor of that paper, and wonders if he couldn't get a job conducting a puzzle department in its columns. We think not. The entire paper is a puzzle department to the taxpayers.—*Norristown Herald.*

It is proposed to practically abolish, by cutting twenty feet wide and twenty feet deep, the narrow isthmus which, dividing the east and west lochs of Tarbert, Scotland, unites the Mull of Kintyre to the mainland. Such a canal would give a direct passage from the Clyde to the Atlantic, saving about 115 miles in the voyage to the west and north of Scotland.

General Telegraphic Miscellany and News.

Mr. Chas. H. S. Small, Supt. of the Stock Indicator department of the W. U. Telegraph Co., is a telegrapher and electrician of well known ability. He is one of the best operators in the business and was formerly chief on the night force. Mr. Small is from Reading, England.

Mr. Geo. M. Phelps, Jr., the Supt. of the Western Electric M'f'g establishment, is one of the agreeable and pleasant gentlemen we occasionally meet about the Western Union building, and we can truly say that it would be hard to find a business man of more energy and executive ability.

Amos T. Larned, the agent of the New England Press, left to-day upon a month's vacation. He will spend the time principally in the White Mountains.

The Western Union Telegraph Co. have very kindly placed at the disposal of the Chess Club, which has been formed of the telegraphers in the service of the Company, room No. 57 on the fifth floor, where the meetings will be held regularly every Tuesday evening, until further notice. The rooms will be supplied with every convenience and comfort for the members, and all chess periodicals, etc., will be found here. Mr. John H. Dwight is the Pres't, and Mr. B. Grant, Sec'y of the club.

On the 21st up to a little after 1 P. M. over fifteen hundred messages had been sent to Boston. This is considered very lively work.

If any one desires to see a busy, active, animated scene let him look into the Western Union general operating room, and here he will find a room extending the whole length and breadth of the immense building crowded to repletion, with every nook and corner filled with a desk and an instrument and an operator hard at work, and a gallery at the Broadway end filled with operatives all busily engaged. There are about three hundred and fifty persons employed in the room, and with the constant moving and changing, and the intense activity of some of the messengers, and the continual coming and going of others and the roar of the many instruments taken altogether it makes a picture and an impression strangely interesting.

The balcony at the Broadway end of the operating room has been completed and the C. N. Department now transact their business upon the elevation. The ceiling has been painted and the tables and railings varnished, and a new clock procured, and, take it altogether, the office appears to be considerably improved while a great deal of room has been gained upon the main room floor, which was already the largest operating room in the world.

The Edison electric light has been introduced into the operating room at Western Union headquarters here, and the scenes presented in the evening are brilliant and pleasant in the extreme. The atmosphere throughout the offices now seems improved greatly since gas was discontinued. There is no more complaint of foul air.

Mr. Chas. Durant, formerly of the C. N. Department, is acting as stenographer for Col. Clowry, who is making his headquarters in the General Manager's office. Col. Clowry is stopping at the West End Hotel at Long Branch, and comes up to the city daily.

Mr. A. H. Seymour, the Manager of the Mutual Union, at 135 Broadway, says the article in the *Review* left off five years of his history in connection with telegraphy.

Mr. A. C. Cockey, the general supply agent of the Western Union Telegraph Company, is one of the most active and pushing men we meet about the Western Union building. His office is on Dey Street, in the Western Union building, and he appears to have his hands brim full of work all the time. These active, busy, useful, working men are the only sort the present management of the Western Union Company seem to have any use for.

Thomas Gray, the pay-roll clerk made the hearts of several operators glad by informing them that their salaries had been raised.

The Edison electric light has been introduced upon the elevation which has just been completed for the Commercial News Department.

The Western Union Co. have some fifty of their operators learning the Wheatstone system, which is the system used in England. The instructors are British operators.

Assistant General Supt. James Merrihew, still continues to make his headquarters in the operating room and looks after the details and has general supervision over affairs. Mr. Merrihew appears to be very popular with all concerned.

France used thirty thousand barrels of cider in making wines last year, but a French bottle of cider with a cobweb twisted around it will always catch the American wine-bibber

It is in the morning when the wire chief performs his most laborious duties, then the wires are all tested and new arrangements and connections made for the day. In the morning the large magnificent switch board with its 500 wires is surrounded by the different chiefs all eagerly testing their wires and getting ready for the business of the day The experts at the Western Union headquarters are Messrs. Catlin, Meyer, Hoyt, Gregory, Baldwin, Halleck, Taintor, Edwards and Bogart.

Moses Taylor, formerly a director in the Western Union Telegraph Company, the recently deceased millionaire, founded and endowed an institution at Scranton, Pa., for the benefit of impoverished and superannuated railroad men, which will bring relief to many poor and distressed railroad men, and cause his name to pass down to posterity coupled with honor, blessings, and thankfulness. Enormous fortunes have been accumulated by speculations in telegraph stocks and in the erection and in the working of telegraphs in this country, and many of our most opulent men and great millionaires owe their fortunes solely to the agency of the telegraph; and those men who have had the control of the telegraphs in this country have all become exceedingly wealthy, and while their wealth has steadily increased, the operatives through whom it was made have correspondingly become poorer and worn out. In my observations I find that, as a class, telegraph operators are generally poor, and while this was not the case in former years, when the wages derived from such employment was much greater than it is now, it is now so beyond any doubt. My principal object in writing this article is to draw the attention of some of the telegraph magnates to Mr. Taylor's beneficence.

It is possible for a man to be so very shrewd that in the long run he cheats himself.

Get gold if you can, young man; but beware of guilt.

"Wise men are governed by evidence; fools by prejudice."

"The crown belongs to achievement, and not to aspiration; to the maturity of a noble career, and not to its juvenescence."

Telephone people should subscribe for the REVIEW, if they wish to be thoroughly posted on matters of great interest and value to them. The next and all future editions will be of especial interest to all engaged in the telephone business.

"I guess this bill's wrong."

"No, that's right," replies Iauch's waiter.

"Go over it again."

Waiter goes over it, and replies:

"It's all right."

"I'm not electioneering for a fat office."

"But those are the regular prices."

"What did I have ?"

"Two soft shell crabs."

"Oh, well, that's all right. Put that down and give me a receipt. I'll sell it to the museum."

"What's wrong about it ?" asked the waiter.

"Nothing ; only as I was paying the price of a piano, I naturally tried to recall the piano and how it tasted. I know there was nothing grand or upright about it, and you have struck me to the tune of so many notes that you ought to have your ivories pounded, and a lot of keys and a dog turned on you.—Sounding-boards, pedals, strings, music-rack, rubber cover and everything else thereunto appertaining, to have and to hold the same unto the said party of the second part, his heirs, executors, administrators and assigns for ever, and the said Julia being by me examined separately and apart from her said husband did further testify that—oh, where am I ? Put a cake of ice on my head. Police !

R. K. M.

Italian papers announce the discovery at Dorgali, in the island of Sardinia, of a great stalactite cave. Fifteen galleries have been already traced. In one of them there is a row of pillars like white marble, and the floor is smooth, resembling the finest basalt. When lit up with torches the combinations and varieties of coloring are wonderfully beautiful.

In a Leadville Church appears a notice: "Don't shoot the organist ; he is doing his best." This naturally exposes to increased danger the man who takes up the collection.

Electrical Invention.

Mr. Charles A. Cooley, of New Britain, Conn., has patented a communicator constructed so that the wearing segments may be quickly renewed without disturbance of the armature wires or the removal of the communicator from its shaft. The armature shaft is made tubular to receive the wires from the armatures, and on this shaft are flanged metal hubs having at each side vulcanite washers for insulating the hubs. Rods extending through the flanged hubs and the washers are enlarged between the two hubs, and are insulated by sleeves of vulcanite. To these rods segments of copper are secured by screws to form the wearing surfaces of the commutator. The copper segments are of suitable thickness to sustain the wear of the commutator brushes for a reasonable length of time, and can be easily removed by taking out the screws and new segments put in place.

See advertisement of Messrs. Delano & Haines, who have Southern Telephone Territory to lease.

Subscribe for the REVIEW OF THE TELEGRAPH AND TELEPHONE.

NEW PATENTS—ELECTRICAL—1882.

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING JULY 25TH, 1882.

261,677 Apparatus for Lighting Gas by Electricity. Charles L. Clarke and John Leigh, Manchester, county of Lancaster, England. Filed Mar. 20, 1882. (No Model.)

261,712. Commutator for Dynamo-Electric Machines. Wm. Hochhausen, New York, N. Y. Filed Mar. 2, 1882. (No Model.)

261,520. Commutator for Dynamo-Electric Machines. R. Edward Ball, New York, N. Y. Filed Feb. 15, 1882. (No Model.)

261,788. Duplex Telegraph. Benjamin Thompson, Buffalo, N. Y. Filed May 27, 1882. (No Model.)

260,790. Electric-Arc Lamp. Elihu Thomson, New Britain, Conn., assignor to the American Electric Company, same place. Filed Dec. 17, 1880. (No Model.)

261,815. Electric-Arc Lamp. James A. Jenny and Charles D. Jenny, Fort Wayne, Ind., assignors to the Fort Wayne Electric Light Company, same place. Filed March 11, 1882. (No Model.)

261,741. Mode of Making Electric Lamps and Carbons for the same. Hiram S. Maxim, Brooklyn, assignor to the United States Electric Lighting Company, New York, N. Y. Filed Feb. 14, 1881, (No Model.)

265,167. Printing-Telegraph. Edward A. Schoettel, Brooklyn, N. Y. Filed Mar. 18, 1882. (No Model.)

261,649. Underground Conduit for Telegraph, Telephone, and Other Wires J. Bernard Apple, Philadelphia, Pa., assignor of one-half to William S. Ha sall, same place. Filed Nov. 3, 1881. (No Model.)

FOR THE WEEK ENDING AUGUST 1, 1882.

261,965. Armature for Dynamo-Electric Machines. Elmer A. Sperry, Cortland, N. Y. Filed Oct. 24, 1881. (No Model.)

261,975. Automatic Telegraph. John Absterdam, New York, N. Y., assignor of two-thirds to Louis G. Dreyfus, same place. Filed Dec. 21, 1881. (No Model.)

262,105. Automatic Telegraph. Albert L. Parcelle, Boston, Mass., assignor to the Merchants Union Telegraph Machine Company, of Maine. Filed Sept, 27, 1881. (No Model.)

262,106. Automatic Telegraph. Albert L. Parcelle, Boston, Mass. Filed Dec. 20, 1881. (No Model.)

262,136. Armature for Dynamo Electric Machines. Henry B. Sheridan, Cleveland, O. Filed Feb 20, 1882. (No Model.)

261,916. Duplex Telegraph. Stephen D. Field, New York, N. Y. Filed Nov. 16, 1881. (No Model.)

261,895. Electric Telegraph. James Anderson, 66 Old Broad St., London, and Benjamin Smith, Princes St., Hanover Square, county of Middlesex, England. Filed Feb. 1, 1882. (No Model.) Patented in England Dec. 20, 1881, No. 5,577.

261,904 Electric-Light Carbon. Edward J. Brooks, East Orange, N. J. Filed May 27, 1882. (No Model.)

261,989. Electric Signal. George W. Blodgett, Boston, and Aaron D. Blodgett, Newton, assignors to themselves, James F. Emerson, Wakefield, and Geo. H. Woodruff, Boston, Mass. Filed Dec. 17, 1881. (No Model.)

262,059. Electrical Switch-Board and Signaling Apparatus. Thomas W. Lane and Frank W. Harrington, Boston, assignors to Charles Williams, Jr., Somerville, Mass. Filed June 9, 1882. (No Model.)

262,164. Electric-Arc Lamp. John E. Watson, Louisville, Ky. Filed April 27, 1882. (No Model.)

262,165. Electric-Arc Lamp. John E. Watson, Louisville, Ky., assignor of five-eighths to James F. Callaway and Geo. S. Allison, both of same place. Filed Mar. 11, 1882. (No Model.)

262,015. Electric-Arc Light. Charles F. de la Roche, Paris, France. Filed Jan. 7, 1882. (No Model.) Patented in Belgium Dec. 12, 1881, No. 56,465, and Feb. 6, 1882, No. 76,982; in France Dec. 14, 1881, and No. 146,541, and in Italy Dec. 31, 1881.

261,850. Magneto Electric Machine. Otto Heikel, Jersey City, N. J., assignor to the National Elecric Light and Power Company, New York, N. Y. Filed May 2, 1879. Patented in France May 18, 1878.

262,027. Machine for Making Electric Cables. John Farrell, Pittsburgh, Pa. Filed Dec. 22, 1881. (No Model.)

262,028. Manufacture of Lead Covered Electric Conductors. John Farrell, Pittsburgh, Pa. Filed Jan. 26, 1882. (No Model.)

262,029. Manufacture of Lead Covered Electric Conductors. John Farrell, Pittsburgh, Pa. Filed Jan. 20, 1882. (No Model.)

261,995. Secondary Battery. Charles F. Brush, Cleveland, O. Filed June 9, 1881. (No Model.)

262,180. Support for Telephones. Amos Hadley, Washington, D. C. Filed Mar. 7, 1882. (No Model.)

262,110. Thermo Chemical Electric Battery. Andrew Patterson, Idlewood, Pa. Filed May 6, 1882. (No Model.)

262,111. Thermo Electric Battery. Andrew Patterson, Idlewood, Pa. Filed May 6, 1882. (No Model.)

262,063. Telegraph and Telephone Signal. Wm. W. Le Grande, Louisville, Ky. Filed Nov. 14, 1881. (Model,)

261,969. Telephone Central Central Office Apparatus. Chas. C. Throop, Auburn, N. Y. Filed Mar. 8, 1882. (No Model.)

261,979. Underground Conduit for Electric Wires. Samuel Anderson. Philadelphia, Pa., assignor of seventeen thirty-seconds to William Allen and Alexander C. McCurdy, same place. Filed Mar. 10, 1882. (No Model.)

FOR THE WEEK ENDING AUG. 8TH.

262,260. Apparatus for Lighting Gas by Electricity. Jacob P. Tirrell, Somerville, assignor to William R. Nutting, Boston, Mass. Filed May 16, 1881. (No Model.)

262,210. Combined insulator, lightning arrester and connector. William H. Eckert, Edward A. Eckert, and John A. Seely, Cincinnati, Ohio. Filed Jan. 6, 1882. (No Model.)

262,271. Combined Gas and Electric-Light Fixture. Sigmund Bergmann, New York, N. Y., assignor of one-half to Edward H. Johnson, same place. Filed April 27, 1882. (No Model.)

262,422. Cooling Device for Electrical Generators. John H. Irwin, Morton. Pa. Filed April 7, 1882. (No Model.)

262,499. Conduit for Electrical Conductors. Samuel D. Strohm, Philadelphia, Pa., assignor of one-half to Harrison Snyder, same place. Filed Feb. 19, 1881 (No Model.)

262,421. Dynamo Electric Machine. John H. Irwin, Morton, Pa. Filed April 24, 1882. (No Model.)

262,544. Dynamo Electric Machine. James A. Jenney, Fort Wayne, Ind., assignor to the Fort Wayne Electric Light Co., same place. Filed April 15, 1882. (No Model.)

262,459. Duplex Telegraph. Garret S. Mott., Philadelphia Pa. Filed May 29, 1882. (No Model.)

262,252. Electric Signaling Apparatus. Horatio W. Southworth, Springfield, Mass. Filed July 28, 1881. (Model.)

262,272. Electrical Extension Chandelier. Sigmund Bergmann, New York, N. Y,, assignor of one-half to Edward H. Johnson, same place. Filed May, 2, 1882. (No Model)

262,285. Electric Telephone. James P. Freeman, Chicago, Ill., assignor to the Home Telephone Company, of Illinois. Filed Sept. 24, 1881. (No Model.)

262,296. Electric-Arc Lamp. Robert A. Johnston, Cleveland, Ohio, assignor of one-half to Alphonse Charbonneau, same place. Filed Jan. 9, 1882. (Model.)

262,333. Electric-Arc Lamp. Charles J. Van Depoele, Detroit, Mich. Filed Aug. 12, 1880. (No (Model.)

262,393. Electric Burglar-Alarm and Door-Bell. James P. Freeman, New York, N. Y. Filed June 17, 1882. (No Model.)

262,417. Electrical Signs. John H. Irwin, Morton, Pa. Filed Dec. 29, 1881. (No. Model.)

262,529. Electrical Armature. James J. Wood, Brooklyn, N. Y., assignor to the Fuller Electrical Company, New York, N. Y. Filed July 2, 1881. Renewed June 21, 1882. (No Model.)

262,418. Incandescent Electric Illuminator. John H. Irwin, Morton, Pa. Filed Dec. 29, 1881. (No Model.)

262,420. Incandescent Electric Lamp. John H. Irwin, Morton, Pa. Filed March 23, 1882. (No Model.)

262,424. Incandescent Electric-Lamp Support. John H. Irwin, Morton, Pa. Filed March 23, 1882. (No Model.)

262,533. Process of Making Elements for Secondary Batteries. Charles F. Brush, Cleveland, Ohio. Filed May 27, 1882. (No Model.)

262,423. Safety Device for Electric Lamps. John H. Irwin, Morton, Pa. Filed April 24, 1882. (No Model.)

262,470. Switch for Incandescent Lamps. Charles G. Perkins, New York, N. Y. Filed Nov. 1, 1881. (Model.)

262,532. Switch for Telephones. Samuel H. Bartlett and Henry E. Waite, New York, N. Y, assignors to Charles F. Livermore, same place Filed April 4, 1882. (No Model.)

262,242. Telegraphic Fire-Alarm Apparatus. Augustus C. Palmer and Augustus H. Palmer, Utica, N. Y. Filed Oct. 7, 1881. (Model.)

262,248. Telephone-Desk. Edgar W. Salisbury, Providence, R. I. Filed April 1, 1882. (No Model.)

262,261. Telephone Exchange System. Frederick O. Vaille, Denver, Colo. Filed May 10, 1882. (No Model.)

262,301. Transferring and Calling Implement for Telephone Exchanges. Lewis Mann, Detroit, Mich. Filed June 16, 1882. (No Model.)

262,419. Visual Telegraphy. John H. Irwin, Morton, Pa. Filed Jan. 23, 1882. (No Model.)

A printed copy of the specification and drawing of any patent published herein, also of any patent issued since 1865, will be furnished by any of the patent solicitors whose advertisements appear in this journal. In ordering, please state the number and date of the patent desired.

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It is well known that Sir Henry Bessemer carried on for many years the manufacture of bronze powder as a trade secret, not venturing to run the risks of infringement which would almost inevitably have followed had he patented his invention. It is not, however, so well known as it should be that, when he began to grow wealthy from another source, he presented freely to the two assistants whom alone he had entrusted with his secret, the whole of the plant and goodwill of the business, with the sole injunction or condition that they should be as faithful to themselves as they had been to him.

Romance of the Golden Ledge.

A story about which there is a fascination which it is impossible to resist when you hear men tell it is that of the "Home of Gold." Somewhere in Southwestern New Mexico, in the Sierra Madre, it is said there is a wonderful valley. Small, inclosed in high rocky walls and accessible only by a secret passage, which is known to but few, is this extraordinary place. It is about ten acres in extent, has running through it a stream, which waters it thoroughly and makes it a perfect paradise, with its exquisite flowers and beautiful trees. In it are thousands of birds of the most beautiful plumage. Running across it is a ledge of pure gold about thirty feet wide, which glistens in the sunlight like a great golden belt. The stream crosses this ledge and, as it runs, murmurs around blocks of yellow metal as other streams do around pebbles. The ledge of gold is supposed to be solid gold and to run down into the centre of the earth. The legend is of Indian origin, and around it clusters a number of Indian stories, in which the name of the ill-fated Montezuma occurs frequently. The descendants of the Aztecs believe firmly that the day will come when Montezuma will return and free them from the dominion of the descendents of the Conquestodores. They believe that the money necessary for this work will be taken from the Madre d'Oro. The secret of the entrance into the valley is carfully guarded by a tribe of Indians living near it, and among them it is only communicated to the oldest men, amid the solemn ceremonies of the medicine lodge. Having such a story to work upon there is little wonder that the vivid imagination of the Mexicans should have built upon it tales of men who have found this wonderful place. One is that a certain Jose Alvaraz, while wandering through the mountain in search of game, saw the valley from the top of the wall. Finding that he could not hope to enter by climbing down, he took up his abode with the Indians who guard the canyon leading into it. The daughter of the chief fell in love with him and betrayed the secret to him. Exactly how she found it out they do not tell. Having been shown the entrance, Jose went in and would possibly have gotten away with some of the gold had he not weighed himself down to such an extent that he could not get up the declivity at the lower end of the passage. He was discovered and the Indians sacrificed him on the golden ledge with all the terrible ceremonies of the old Aztec religion. She, in despair at losing him, threw herself from the high walls into the valley below. Hundreds of prospectors have spent months of toil trying to find the Madre d'Oro, but it is scarcely necessary to say without result.—*Las Cruces Republican.*

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Mr. Fred. W. Cushing, formerly assistant chief operator in the Western Union Main Office this city, who went to the Paris Exposition in charge of Professor Elisha Gray's Exhibits—the principal of which was the harmonic system of telegraphing—returned home on Saturday, the 26th inst., and was entertained that evening at dinner at Martinelli's, by about 15 of his former office associates, among whom he was very popular. During the past year, Mr. Cushing has been introducing the system in various parts of Europe, and it is understood he returns here to put the system into operation on the lines of one of the recently-formed telegraph companies.

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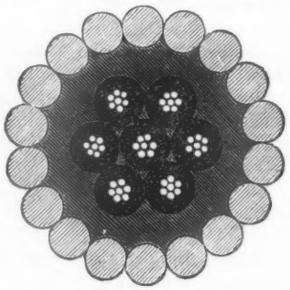

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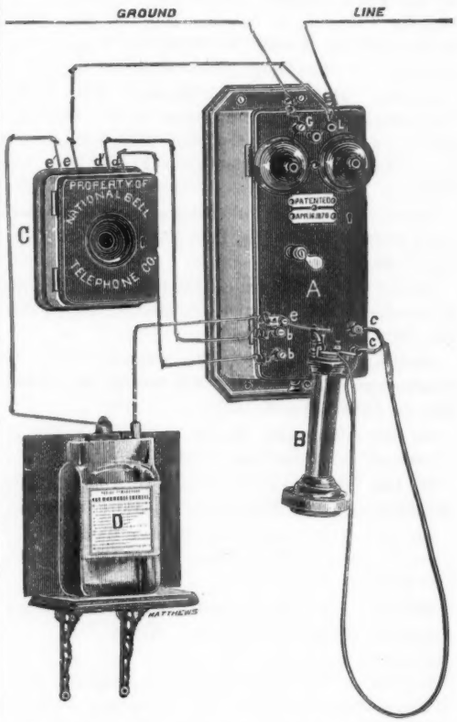

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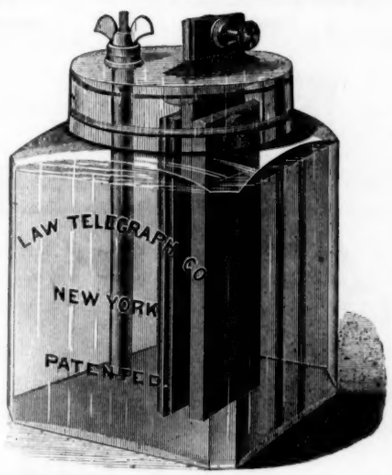

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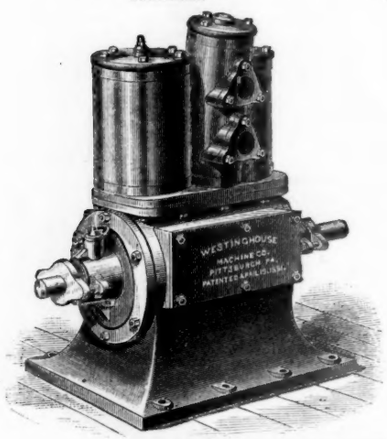

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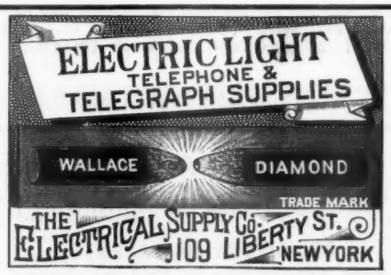

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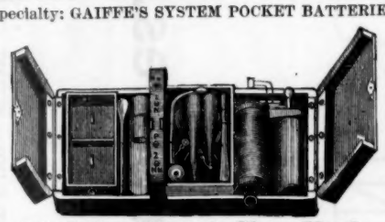

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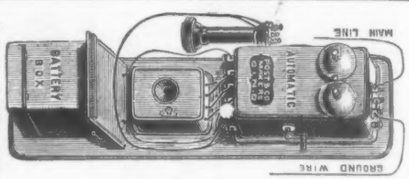

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